

Appln No. 10/535,616
Amdt date June 14, 2007
Reply to Office action of December 14, 2006

REMARKS/ARGUMENTS

In the Office action mailed December 14, 2006, the specification and claims were objected to and claims 1-15 were rejected under 35 U.S.C. § 101 and 35 U.S.C. § 102. Claims 1, 2, 9, and 11-14 are being amended. New claim 16 is being added. Claims 1-16 are now pending of which claims 1, 11 and 14 are independent.

The specification and some claims are objected to for typographical reasons. The specification, and claims are amended to resolve those typographical matters. In addition, a paragraph from the priority provisional application is being inserted into the text, and it is noted that the priority provisional application was incorporated by reference in the application. For the convenience of the Examiner, it is also noted that the paragraph of the provisional application may be found in page 17 of the document entitled COMPRESSED VECTOR-BASED SPECTRAL ANALYSIS AND METHOD AND SYSTEM FOR NONLINEAR RF BLOCKS.

35 U.S.C. §101 Rejection

The Office action states that "Regarding independent claim 1, claiming an output signal is not sufficient to be statutory material as there is no tangible, useful, or concrete result." Office action, p. 2. Claim 1 is directed to "a method using a computer of simulating radio frequency signal processing circuitry." Claim 1 specifies operations including:

forming a compressed vector based equivalent representation of a radio frequency signal in a wireless communication system;

performing processing on the compressed vector based equivalent representation to simulate operation of the radio frequency processing circuitry on the radio frequency signal, the processing forming a processed compressed vector based equivalent of the radio frequency signal; and

converting the processed compressed vector based equivalent of the signal to a representation of the radio frequency signal as operated on by the radio frequency processing circuitry

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In performing 35 U.S.C. § 101 evaluations, the claim as a whole must be considered. Diamond v. Diehr, 450 U.S. 175, 188-89 (1981) and MPEP § 2106. II. C, p. 2100-8. The Office action, in rejecting claim 1 under 35 U.S.C. § 101, improperly looked only at a small portion of claim 1 (the language of which it is noted is now changed), and the rejection was therefore improper.

In addition, the invention of claim 1 does produce a useful, concrete, and tangible result. Claim 1 provides a method for simulating radio signal processing circuitry as detailed above. As discussed in the application "Simulation of wireless communication components allows designers to investigate new designs and to test changes without expending time and money in producing physical samples." Application, p. 1, lines 19-21.

Moreover, claim 1 ultimately includes "converting... to a representation of the radio frequency signal as operated on by the radio frequency processing circuitry." See also, e.g., Application, p. 2, lines 35-40, Figs. 7-9, 11, and 12 (showing simulated output of various components).

Accordingly, claim 1 and the dependent claims comply with 35 U.S.C. § 101.

The Office action states "Regarding independent claim 11, there is no useful, tangible, and concrete result. Converting signals is not sufficient to be statutory material. In addition, signals do not constitute statutory material." Office action, p. 3

Claim 11 is directed to a method using a computer of modeling circuitry. Claim 11 specifies operations including:

- converting representations of first radio frequency signals to compressed vector based equivalent signals;
- processing the compressed equivalent signals to form further compressed vector based equivalent signals to simulate operation of radio frequency circuitry on the first radio frequency signals; and

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converting the further compressed equivalent signals to representations of second radio frequency signals resulting from operation of the circuitry on the first radio frequency signals.

Again, the Office action appears to not have considered the claim as a whole, as must be done. In addition, claim 11 specifies "converting...to representations of second radio frequency signals resulting from operation of the circuitry on the first radio frequency signals."

Accordingly, claim 11 and its dependent claims comply with 35 U.S.C. § 101.

Claim 14 is directed to "A system for modeling of RF signal processing" and goes on to specify "converter blocks," "signal processing blocks," and "reconversion blocks." As such, system claim 14 is directed to tangible elements and not to software per se as stated in the Office action. However, it should be noted that if a computer program is being claimed as part of an otherwise statutory manufacture or machine, the claim remains statutory irrespective of the fact that a computer program is included in the claim. MPEP 2106.01, p. 2100-18.

35 U.S.C. §102(b) Rejection

The Examiner has rejected claims 1-15 also under 35 U.S.C. §102(b) as being anticipated by Brandl et al., "High Speed Signal Processing with Tapped Dispersive SAW based Delay Lines," which is a 2000 IEEE publication.

Claim 1 is amended to recite "A method using a computer of simulating radio frequency signal processing circuitry, comprising: forming a compressed vector based equivalent representation of a radio frequency signal in a wireless communication system; performing processing on the compressed vector based equivalent representation to simulate operation of the radio frequency processing circuitry on the radio frequency signal~~operation~~, the processing forming a processed compressed vector based equivalent of the radio frequency signal; and ~~forming an output signal using converting~~ the processed compressed vector based equivalent of the signal to a representation of the radio frequency signal as operated on by the radio frequency

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processing circuitry" (with markings to show changes) Support for amendments to claim 1 is found throughout the specification and drawings and, for example, at p. 3, lines 20-27, p. 7, lines 25-39, p. 8, lines 30-34.

As amended, claim 1 is not taught or suggested by Brandl and remains patentable in view of this reference.

Brandl is directed to a method of signal processing in chirp spread spectrum systems using tapped dispersive surface acoustic wave (SAW) delay lines. (Brandl, abstract.) A SAW based chirp filter includes an interdigital transducer (IDT). (Brandl, figure 1.) The output of the filter is the sum of the in-phase components of the signal arriving at the IDT in the SAW filter times the transmission function of the filter. (Brandl, section II.) The method controls the spectral parts of the excited charge within the IDTs before summation. The IDT includes a number of bus bars that each receive a certain sub-band of the frequency arriving at the filter. (Id.) Some of the bus bars are interrupted and the charge at the rest is externally summed. This is called gating of a tap; each tap represents a frequency subband of the chirp spectrum; gating a tap is suppressing the corresponding subband. The chirp to which this filtering is applied is compressed chirp. (Id., see also figure 3 of Brandl.) Brandl shows that gating the filter increases the signal to interference ratio of the compressed chirp. (Brandl, figures 3 and 4.)

Figure 5 of Brandl is cited against "forming a compressed vector based equivalent signal" of claim 1. (Office action, p. 3, item 8.) Figure 5 shows the schematic diagram of a chirp transceiver that includes a chirp compressor. (Brandl, figure 5.) The chirp compressor of Brandl, however, appears to be a method of pulse compression, which increases the frequency of a pulse, as opposed to, for example, data compression which reduces the number of data points used. In Brandl, the input to the chirp compressor of figure 5 is $s_j(t)$ and the output is $g(t)$ which is obtained by convolution of $s_j(t)$ and $h(t)$. (Brandl, figure 5, p. 174.) The equation provided for $h(t)$ is the transfer function of the chirp compressor and obtains a down chirp compression. (Brandl, equation 3.6.) Accordingly, the compression disclosed by Brandl does not teach or

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suggest "forming a compressed vector based equivalent of a signal" of claim 1 and claim 1 is not anticipated by this reference nor obvious in view of it.

Claims 2-10 depend from claim 1 and are believed to be patentable because of their dependence from claim 1.

Claim 11 is amended to recite " A method using a computer of modelling modeling circuitry, comprising: converting representations of first radio frequency signals to compressed vector based equivalent signals; processing the compressed equivalent signals to form further compressed vector based equivalent signals to simulate operation of radio frequency circuitry on the first radio frequency signals; and converting the further compressed equivalent signals to representations of second radio frequency signals resulting from operation of the circuitry on the first radio frequency signals." (with markings to show changes). Support for amendments to claim 11 is found throughout the specification and drawings and, for example, in the passages cited in support of amended claim 1.

As amended, claim 11 is not taught or suggested by Brandl and remains patentable in view of this reference for reasons similar to those discussed above regarding claim 1.

Claims 12-13 depend from claim 11 and are believed to be patentable because of their dependence from claim 11.

Claim 14 is amended to recite " A system for performing RF signal processing modelling modeling, the system comprising: signal generator blocks forming compressed vector based equivalent signal representations of radio frequency signals; RF signal processing blocks processing compressed vector based equivalent signal representations to simulate RF signal processing; and conversion blocks converting compressed vector based equivalent signals to RF signal representations of signals resulting from RF signal processing." (with markings to show changes). Support for amendments to claim 14 is found throughout the specification and drawings and, for example, in figures 3 and 5 and on p. 7, lines 25-39, of the specification

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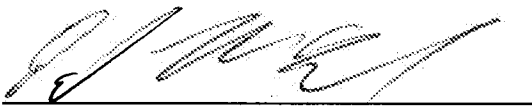
corresponding to paragraph [0056] of the printed patent application publication, in addition to the passages cited in support of claims 1 and 11. As amended, claim 14 is not taught or suggested by Brandl and remains patentable in view of this reference for reasons similar to those discussed above regarding claim 1.

New claim 16 is added. Support for new claim 16 is found throughout the specification and drawings and, for example, on p. 3, lines 20-25 of the specification.

Claim 16 depends from claim 1 and is believed to be patentable because of its dependence from claim 1.

It is respectfully submitted that the pending claims are directed to statutory subject matter and are allowable over the cited reference. As such, allowance of the above Application is requested.

Respectfully submitted,
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